CLAIMS

WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95.0% identical to a sequence selected from the group consisting of:

(a) a polynucleotide fragment of SEQ ID NO:1 or a polynucleotide fragment of the cDNA sequence included in ATCC Deposit No: XXXXX, which is hybridizable to SEQ ID NO1;

(b) a polynucleotide encoding a polypeptide fragment of SEQ ID NO:2 or a polypeptide fragment encoded by the cDNA sequence included in ATCC Deposit No: XXXXX, which is hybridizable to SEQ ID NO:1;

(c) a polynucleotide encoding a polypeptide domain of SEQ ID NO:2 or a polypeptide domain encoded by the cDNA sequence included in ATCC Deposit No: XXXXX, which is hybridizable to SEQ ID NO:1;

(d) a polynucleotide encoding a polypeptide epitope of SEQ ID NO:2 or a polypeptide epitope encoded by the cDNA sequence included in ATCC Deposit No: XXXXX, which is hybridizable to SEQ ID NO:1;

(e) a polynucleotide encoding a polypeptide of SEQ ID NO:2 or the cDNA sequence included in ATCC Deposit No: XXXXX, which is hybridizable to SEQ ID NO:1, having potassium channel beta subunit activity;

(f) a polynucleotide which is a variant of SEQ ID NO:1;

(g) a polynucleotide which is an allelic variant of SEQ ID NO:1;

(h) an isolated polynucleotide comprising nucleotides 420 to 1097 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 2 to 227 of SEQ ID NO:2 minus the start codon;

(i) an isolated polynucleotide comprising nucleotides 417 to 1097 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 1 to 227 of SEQ ID NO:2 including the start codon;

(j) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:1; and

(k) a polynucleotide capable of hybridizing under stringent conditions to any one of the polynucleotides specified in (a)-(j), wherein said polynucleotide

does not hybridize under stringent conditions to a nucleic acid molecule having a nucleotide sequence of only A residues or of only T residues.

2. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises a nucleotide sequence encoding a human potassium channel beta subunit protein.

3. A recombinant vector comprising the isolated nucleic acid molecule of claim 1.

4. A recombinant host cell comprising the vector sequences of claim 3.

5. An isolated polypeptide comprising an amino acid sequence at least 91.0% identical to a sequence selected from the group consisting of:

(a) a polypeptide fragment of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: XXXXX;

(b) a polypeptide fragment of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: XXXXX, having potassium channel beta subunit activity;

(c) a polypeptide domain of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: XXXXX;

(d) a polypeptide epitope of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: XXXXX;

(e) a full length protein of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: XXXXX;

(f) a variant of SEQ ID NO:2;

(g) an allelic variant of SEQ ID NO:2;

(h) a species homologue of SEQ ID NO:2;

(i) a polypeptide comprising amino acids 2 to 227 of SEQ ID NO:2, wherein said amino acids 2 to 227 comprise a polypeptide of SEQ ID NO:2 minus the start methionine;

(j) a polypeptide comprising amino acids 1 to 227 of SEQ ID NO:2; and

(k) a polypeptide encoded by the cDNA contained in ATCC Deposit No. XXXXX.

6. The isolated polypeptide of claim 5, wherein the full length protein comprises sequential amino acid deletions from either the C-terminus or the N-terminus.

7. An isolated antibody that binds specifically to the isolated polypeptide of claim 5.

8. A recombinant host cell that expresses the isolated polypeptide of claim 5.

9. A method of making an isolated polypeptide comprising:

(a) culturing the recombinant host cell of claim 8 under conditions such that said polypeptide is expressed; and

(b) recovering said polypeptide.

10. The polypeptide produced by claim 9.

11. A method for preventing, treating, or ameliorating a medical condition, comprising the step of administering to a mammalian subject a therapeutically effective amount of the polypeptide of claim 5 or the polynucleotide of claim 1.

12. A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or absence of a mutation in the polynucleotide of claim 1; and

(b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or absence of said mutation.

13. A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or amount of expression of the polypeptide of claim 5 in a biological sample; and

(b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or amount of expression of the polypeptide.

14. A process for making polynucleotide sequences encoding a gene product having altered potassium channel beta subunit activity comprising,

a) shuffling a nucleotide sequence of claim 1,

b) expressing the resulting shuffled nucleotide sequences and,

c) selecting for altered potassium channel beta subunit activity as compared to the potassium channel beta subunit activity of the gene product of said unmodified nucleotide sequence.

15. A shuffled polynucleotide sequence produced from the process of claim 14.

16. An isolated nucleic acid molecule consisting of a polynucleotide having a nucleotide sequence selected from the group consisting of:

(a) a polynucleotide encoding a polypeptide of SEQ ID NO:2;

(b) an isolated polynucleotide consisting of nucleotides 420 to 1097 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 2 to 227 of SEQ ID NO:2 minus the start codon;

(c) an isolated polynucleotide consisting of nucleotides 417 to 1097 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide corresponding to amino acids 2 to 227 of SEQ ID NO:2 including the start codon;

(d) a polynucleotide encoding the K+betaM3 polypeptide encoded by the cDNA clone contained in ATCC Deposit No. XXXXX; and

(e) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:41.

17. The isolated nucleic acid molecule of claim 16, wherein the polynucleotide comprises a nucleotide sequence encoding a human potassium channel beta subunit protein.

18. A recombinant vector comprising the isolated nucleic acid molecule of claim 16.

19. A recombinant host cell comprising the recombinant vector of claim 18.

20. An isolated polypeptide consisting of an amino acid sequence selected from the group consisting of:

(a) a polypeptide fragment of SEQ ID NO:2 having potassium channel beta subunit activity;

(b) a polypeptide domain of SEQ ID NO:2 having potassium channel beta subunit activity;

(c) a full length protein of SEQ ID NO:2;

(d) a polypeptide corresponding to amino acids 2 to 227 of SEQ ID NO:2, wherein said amino acids 2 to 227 comprise a polypeptide of SEQ ID NO:2 minus the start methionine;

(e) a polypeptide corresponding to amino acids 1 to 227 of SEQ ID NO:2; and

(f) a polypeptide encoded by the cDNA contained in ATCC Deposit No. XXXXX.

21. The method for preventing, treating, or ameliorating a medical condition of claim 11, wherein the medical condition is a neural disorder.

22. The method for preventing, treating, or ameliorating a medical condition of claim 21, wherein the medical condition is a neural disorder related to aberrant neurotransmitter release.

23. The method for preventing, treating, or ameliorating a medical condition of claim 21, wherein the medical condition is a neural disorder related to drug addiction.

24. The method for preventing, treating, or ameliorating a medical condition of claim 11, wherein the medical condition is a disorder related to hyper potassium channel activity.

25. The method for preventing, treating, or ameliorating a medical condition of claim 11, wherein the medical condition is an immune disorder.

26. The method for preventing, treating, or ameliorating a medical condition of claim 25, wherein the medical condition is an immune disorder related to aberrant NF-kB activity.

27. The method for preventing, treating, or ameliorating a medical condition of claim 25, wherein the medical condition is an immune disorder related to transplant rejection.

28. The method for preventing, treating, or ameliorating a medical condition of claim 25, wherein the medical condition is an immune disorder in which immunosuppression would be desirable.

29. The method for preventing, treating, or ameliorating a medical condition of claim 11, wherein the medical condition is a proliferative disorder.

30. The method for preventing, treating, or ameliorating a medical condition of claim 29, wherein the medical condition is a cancer.

31. The method for preventing, treating, or ameliorating a medical condition of claim 29, wherein the medical condition is a proliferative disorder related to aberrant cell cycle regulation.

32. The method for preventing, treating, or ameliorating a medical condition of claim 31, wherein the medical condition is a proliferative disorder related to an aberration(s) in the G1 or G2 cell cycle checkpoint.

33. The method for preventing, treating, or ameliorating a medical condition of claim 29, wherein the medical condition is a proliferative disorder related to aberrant DNA damage repair.

34. A method for proliferating hematopoietic stem cells, comprising the step of administering to a mammalian subject a therapeutically effective amount of an antagonist of the polypeptide of claim 5 or the polynucleotide of claim 1.